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ANALYSIS OF DOCTORAL THESIS ACCEPTED BY THE VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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ABSTRACT

This study aims to determine the research activities at Visvesvaraya Technological University (VTU) over the last six years and how they have developed. There were 684 doctoral degrees awarded in VTU's eight subject domains from 2012 to 2017. The researcher collected information about research advancement and development in the study. An analysis of a doctoral thesis is presented as tables and figures in this paper.

KEYWORDS: VTU, Ph.D. thesis, research trends, doctoral degrees.

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Original Article

1. INTRODUCTION

A scientific discovery or invention can lead to a new field of research that contributes to the betterment of humanity. The process of study leads to creativity and improves our understanding of the world, provides solutions to specific problems, and improves our lives. It included research activity in its operations and practices. In addition, research findings provide societal value, and they should be conducted in a wide range of fields, and they should occupy a prominent position in society. Thus, research helps to solve specific problems and improve processes and practices. The research community has become an international endeavor in recent decades. Science and technology play a significant role in creating innovative jobs, economic opulence, addressing national issues and global challenges, and fostering international collaborations today more than ever competitiveness. As a result of significant increases in research activity and the production of large numbers of doctoral theses, new fields of knowledge and subfields emerge rapidly. These new fields are becoming increasingly popular as academic disciplines.

There are many new areas of study emerging within the field of engineering, and they are growing faster than ever before. Several technological Universities/deemed to be Universities/private Universities and national importance institutes that have emerged recently in India, promoting technical education development. In addition to advanced academic training institutions, universities are considered as a center of higher learning and provide basic research training for researchers in specialized fields. Research success is determined by the skills they acquire at the University. In terms of scientific progress, universities play an essential role in research. In recent years, many research activities have been conducted at universities and research institutions around the world.

2. BACKGROUND OF THE STUDY

India's technical education system contributes significantly to our overall education system and plays a vital role in our nation's economic and social development. As of 2010, India had 88 technical universities, of which 34 were state universities, 32 were deemed to be universities, and 22 were self financed universities. Some of these are

confined to one or two disciplines, such as IT and business management. First Technological University in India, Jawaharlal Nehru Technological University, was established in 1972. The technical universities in India have been training technologists over the past four decades (Ratnalikar and Patil).

The Government of Karnataka established a state-funded university in memory of great Engineer, Administrator, Entrepreneur, and Statesman Sir. M. Visvesvaraya in 1998 to cater to the requirements of different industries by providing solid theoretical knowledge and practical experience. The VTU has successfully brought together several colleges that formerly belonged to various regular universities in the state, with their own curriculums, regulations, and practices under one banner. It has four regional centers spread across Karnataka in Belagavi, Bengaluru, Kalaburagi, and Mysuru. A university consists of multidisciplinary and multi-level institutions offering a wide range of technical, scientific, and entrepreneurship programs. It is achieving steady improvement in creating and sustaining the best technological platform for technical education in Karnataka. It is the first University in the country to conduct examinations in a digital format and adopt a digital evaluation system. It has created centers of excellence across Karnataka to impact technology and encourage innovation. As a result, many of its stakeholders received doctorates from the university to enhance the research culture in technical education throughout Karnataka. The present study aims to analyze Ph.D. awards over the past twenty years.

3. LITERATURE STUDY

Indian universities are playing a significant and vital part in creating and disseminating scientific information by providing opportunities to academic scholars to conduct research studies and bring out Ph.D. dissertations as a unique genre of information resource. It is noted that several doctoral theses are produced annually by these universities in India. The ProQuest Theses and Dissertations from 2000 and 2015 were compared. By 2015, for-profit online institutions produced more than twice as many doctoral dissertations as in 2010. Among all dissertations written by online institutions, 36% are in public administration. As a result of the decline of public administration as a field of study, doctorate degrees in public administration decreased to 2% of total degrees conferred. In order to identify whether there are any overlaps or discrepancies between program types, we conducted a thematic and comparative assessment of top producers of all degree types. A broader perspective is provided on the pedagogical implications of potential changes in public affairs education (Derek & Adam, 2018).

Another study was carried out by Hallinger reviewed the full set of 130 doctoral dissertations completed between 1983 and 2010, which used the Principal Instructional Management Rating Scale (PIMRS). The study examines the focus of research, conceptual models, research designs, and statistical techniques (Hallinger, 2011). Rady, Williams, and Bailey assessed the authors, subjects, research methods, and outcomes of 1581 doctoral dissertations in special education spanning five years, and then discussed the findings, implications for future research, and implications for professional practice (Rady, Williams, and Bailey, 1988). Horton & Hawkins examined the content of 252 dissertation abstracts produced by social work research students in 2006. Only 13.49% of the abstracts indicated a focus on social work intervention. According to the researchers, this finding suggests a paradigm shift in social work education and practice (Horton & Hawkins, 2010). A review of 1,089 Korean doctoral dissertations completed between 1982 and 2010 was carried out by Lee et al. based on the analytic framework developed by the researchers. This study provided the opportunity to shed some light on Korean doctoral dissertations' current state and consider the future of nursing studies in Korea (Lee et al., 2012).

A study by Char lee, Brent, and Betty examined the 118 tourism doctoral dissertations submitted between 2000

and 2010. The study revealed influence theories, tourism demand, and political economics as the most common theoretical approaches, with quantitative methods as the most common empirical methods. In their view, an in-depth study is necessary to determine how economics' dropping negatively affects tourism research, teaching, and learning (Char lee, Brent, & Betty, 2013). Drysdale, Graham, Spring, and Halverson analyze 205 doctoral dissertations and postgraduate dissertations in blended learning. Along with qualitative data analysis, recent developments in statistical inference and descriptive statistics are discussed. Numerous subtopics define nine topics, and these topics are analyzed to identify research gaps and opportunities for future research as collaborative learning continues to flourish (Drysdale, Graham, Spring, and Halverson, 2013).

Zonget al. studied the internal and external structure and relationship of research fields in doctoral dissertations of Library and Information Science (LIS) during the period of 1994 to 2011. The study reveals Wuhan University is the most productive university in China for the formative research domain of LIS. In their view, these fields of research areas vary, as many of these areas are still nascent accordingly, the well-developed and core research fields are limited (Zonget al., 2013). Researchers at Visvesvaraya Technological University (VTU) analyzed the bibliographic details of doctoral degrees awarded from 2007 to 2011. Since 2007, 250 doctorates have been awarded in engineering and related fields. It is reported that the number of doctorate degrees awarded each year increased significantly from 2010 to 2011. There were substantial studies conducted about 156 (62.40%) and mechanical engineering (40.40%) in 2010 (Mulla & Konnur, 2013). The present study is confined to the bibliographic details of engineering and allied branches of engineering doctoral degrees awarded from 2012 to 2017 in VTU. The followings are the study's objectives as outlined in the succeeding sections.

4. OBJECTIVES OF THE STUDY

In this study, we analyze the progress and improvement of research activities in VTU during the past two decades. These are the specific objectives:

- *To measure the growth of Visvesvaraya Technological University's research productivity.*
- *Identify the role of research supervisors in the development of their research area.*
- *Determine the domain area that is most prevalent in the Visvesvaraya Technological University.*
- *To analyze the rankings of various research guides.*
- To quantify the number of pages in all the University's theses
- *In order to analyse the period in which research scholars submitted their work and award those degrees*

5. METHODOLOGY AND SCOPE

The study collected its data from two reputable sources. The basic information was published by the VTU's website (https://vtu.ac.in/) and the University News, a weekly journal from the Association of Indian Universities. Separately, the records from both sources were gathered, and there was an Excel spreadsheet comprising 684 individual records was prepared after thorough analysis to eliminate redundant data. This worksheet served as the major tool component for analyzing and interpreting the data. For data analysis, a statistical software package was used. By using the package, we generated frequency distributions and cross tables.

6. LIMITATION OF THE STUDY

The study examines only 684 of the 934 doctorates awarded at VTU. The research conducted by Mulla and Konnur covering the period 2007 to 2011 was excluded from the current study. The study examined and limited our analysis to only the doctoral degrees conferred at convocations between 2012 and 2017.

7. DATA ANALYSIS AND INTERPRETATION

7.1 Chronological Distribution of Doctoral Dissertations

Figure 1 indicates that there has been substantial progress in terms of research output from the VTU and the number of doctoral degrees awarded from the year 2012 to 2017. It is clear from figure 1, that research activities were quite low till 2017 and the research productivity were increased in 2013.

This was because of the need and accentuation on enrolling qualified faculty primarily in the Universities and affiliation institution/constituent College. It was additionally a fact that University Grants Commission (UGC) and the All India Council for Technical Education (AICTE) began offering inclination to the candidates who have done research in the particular domain. In the current situation is that on a normal 114 doctoral thesis are being granted each year. During the period 2012 and 2017, a normal of just 83 theses were granted doctoral degrees. From 2013 to 2016 the research output reached a significantly high value of 130 (75.89%%) doctoral theses.

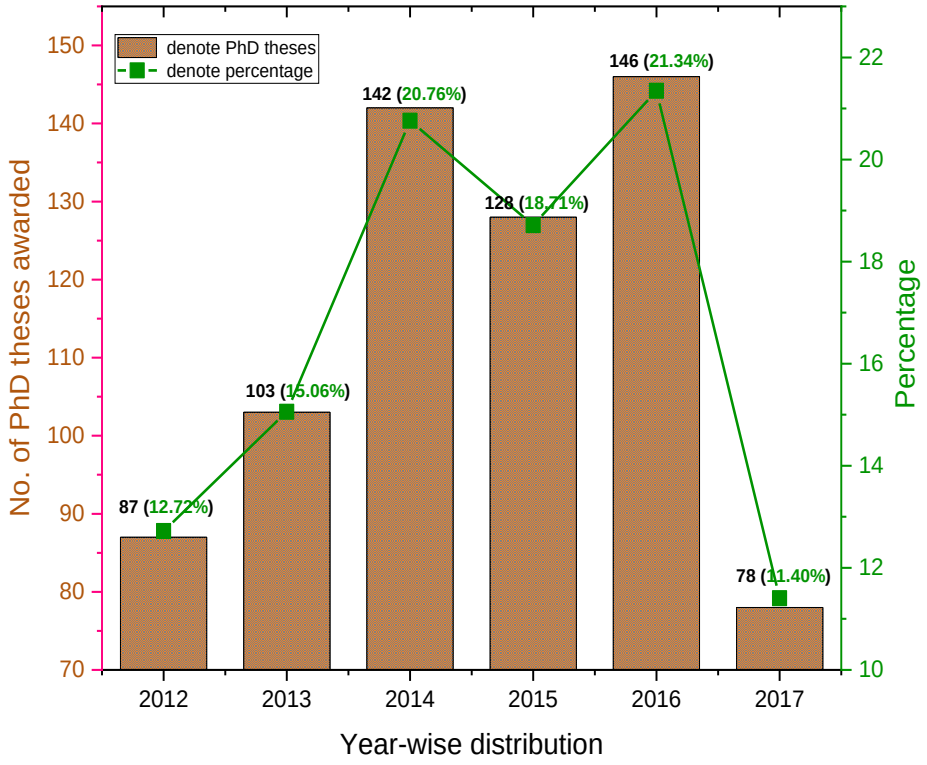


Figure 1: Chronological Distribution of Doctoral Dissertations

7.2 Domain-Wise Distribution of Doctoral Dissertations

Table 1 shows domain wise productivity of doctoral dissertations. In total 684 doctoral degrees were awarded in engineering, of which 202 (29.53%) in mechanical engineering and 105Applied Sciences (15.35%) in doctoral degrees

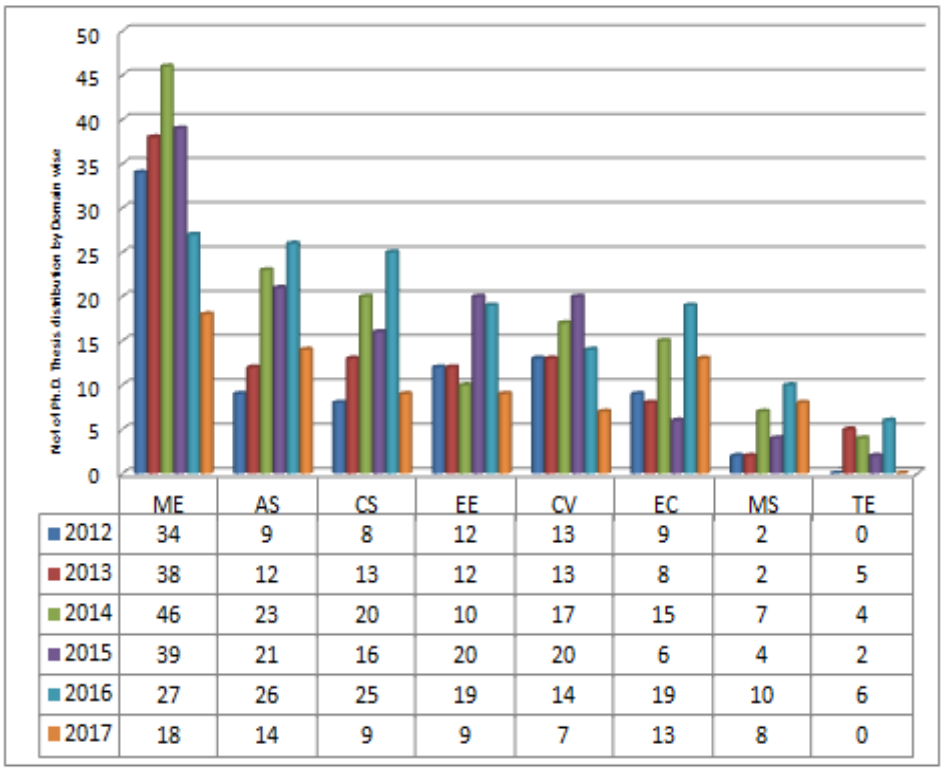
were awarded. Similarly in Computer Science & Engineering 91 (13.30%) doctoral degrees were awarded followed by 84 (12.28%) in Civil engineering. However, in Electrical & Electronics Engineering 82(11.99%) were awarded which is comparatively more than Electronics & Communication Engineering 70 (10.23%). The Management Science and Technology doctoral degrees were least awarded with 33 (4.82%) and 17 (2.49%) respectively.

Table 1: Domain-Wise Distribution of Doctoral Dissertations

Sl.No.	Domains	Subject Code	Ph.D's	Percentage
1	Mechanical Engineering	ME	202	29.53
2	Applied Sciences	AS	105	15.35
3	Computer Science & Engineering	CS	91	13.30
4	Civil Engineering	CV	84	12.28
5	Electrical & Electronics Engineering	EE	82	11.99
6	Electronics & Communication Engineering	EC	70	10.23
7	Management Sciences	MS	33	4.82
8	Technology	TE	17	2.49
Total			**684**	**100**

7.3 Frequency Wise Distribution of Doctoral Dissertations

Figure 2 reveals that utmost research was carried out in the year 2016. Out of a total of 684 theses, 202 were awarded in mechanical engineering, 105 in Applied Science, 91 in Computer Science, 84 in Civil Engineering, 82 in Electrical Engineering,70 in electronics communication engineering, 33 in Management Studies and Technology it was least with 17 doctoral degrees being awarded. In 2012, 87 doctoral degrees were awarded, out of which 34 are in mechanical, 9 in applied science, 8 in Computer Science, 13 in Civil engineering, 12 in Electrical Engineering, 9 in Electronics and communication 2in Management Studies, and there is no thesis awarded in the Technology. In 2013, 103 doctoral degrees were awarded out of which 38 doctoral degrees were awarded in mechanical, each 12 in applied science,12 in computer and Civil engineering, 12 in Electrical Engineering and 8 in Electronics, 5 in technology and 2 in Management Studies respectively. In the year 2014, 142 doctoral degrees were awarded out of which 46 are in mechanical, 23 in applied sciences, 20 in computer,17 in civil, 10 in electrical,15 in electronics, 7 in management and only 5 in technology. In the year 2015, 128 doctoral degrees were awarded out of which 39 are in mechanical, 21in applied sciences, 16 in computer, 20 in civil and electrical, 6 in electronics, 4 in management and only 2 in technology. The least research activities were found in 2017 i.e. only 78 doctoral degrees were awarded, out of which 18 were in mechanical engineering,14 in applied science, 9 in computer science and electrical electronics engineering, and 7 in civil, 13 in electronics 8 in management and there is no award in technology. This is obviously showed that research being carried out at VTU has superior with an up downtrend yearly shown in figure two.



	ME	AS	CS	EE	CV	EC	MS	TE
2012	34	9	8	12	13	9	2	0
2013	38	12	13	12	13	8	2	5
2014	46	23	20	10	17	15	7	4
2015	39	21	16	20	20	6	4	2
2016	27	26	25	19	14	19	10	6
2017	18	14	9	9	7	13	8	0

Figure 2: Frequency Wise Distribution of Doctoral Dissertations

7.4 Rank Wise Distribution of Doctoral Thesis

Figure 3 projects the rank-wise distribution of doctoral degrees awarded from the VTU. 202 (29.53%) doctoral degrees were awarded in mechanical engineering department which is the highest amongst all the departments. Applied sciences stands second with 105 (15.35%) degrees were awarded. This is followed by Computer Science engineering (91, 13.30%) and Civil engineering (84, 12.28%) is in third and fourth place. Next stands Electrical electronics engineering with 82 (11.99%), Electronics and communication engineering 70(10.23%). Similarly in management studies 33 (4.82%) and in Technology 17 (2.49%) doctoral degrees were awarded, which stands in 7th and 8th rank respectively. This clearly indicates that rank wise research output from VTU in mechanical engineering department is substantial.

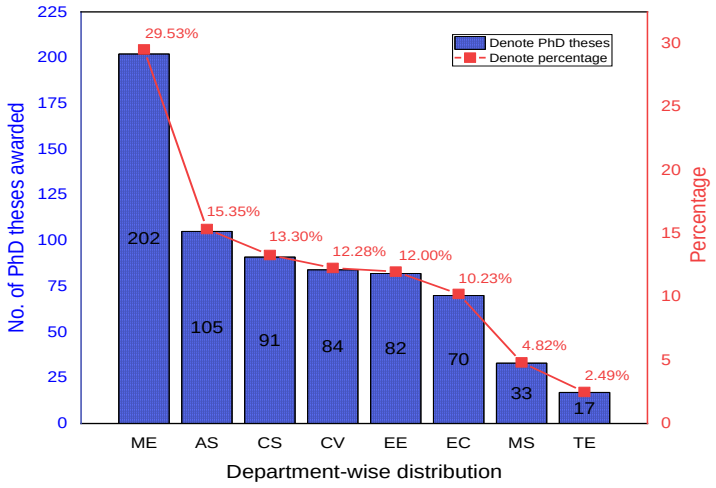


Figure 3: Rank Wise Distribution of Doctoral Dissertations

7.5 Productivity of Research Supervisors

Research supervisors assume a significant role in the productivity of research outputs by departments wise. The actual research scholars, appropriate direction from supervisor and the facilities given by Universities assume a significant part in the usefulness of research output. Figure 4 delineates the output of research supervisors.

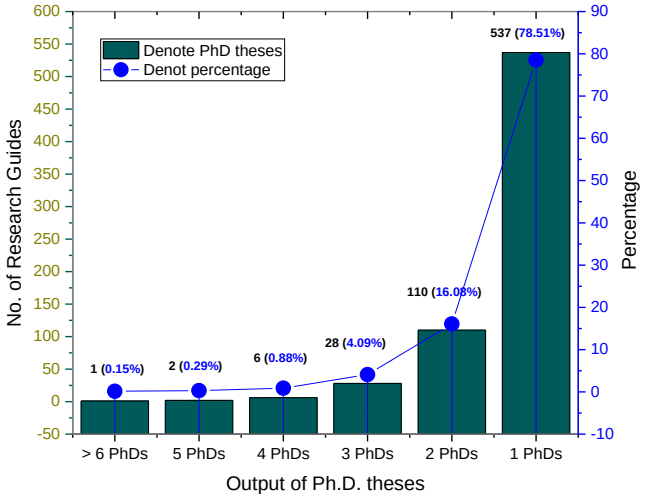


Figure 4: Output of Research Guides

7.8 Rank Wise Distribution of Research Guides

It is come to be known that about 487 research supervisors were engaged in guiding research scholars at VTU. Table two shows that more than 50 (340) percent of research supervisors have successfully guided one doctoral degree student. 22.58 (110) percent of supervisors' successfully guided two doctoral degree students. Similarly, 5.74 (28) percent of supervisors guided 3 doctoral degree students. Only 1.23 percent of the research guides supervised up to 4 doctoral degree students. And two supervisors guided 5 students and only one supervisor Dr. S A Kori guided to 6 students who stand the first rank among the research supervisors'. It clearly shows that comparatively research supervisor (340) guided single research students are more in VTU and its affiliated research centers.

Table 2: Distribution of Research Guides by Rank

Sl. No.	Name of the Supervisor	Affiliation	Broad	No. of Ph.D. theses	Percentage	Rank
1	Dr. S A Kori	BEC, Bagalkot	ME	6	0.88	1
2	Dr Sunil Kumar S Manvi	BEC, Bagalkot	EC	5	0.73	2
3	Dr V Lokesh	AIT, Bengaluru	AS	5	0.73	
4	B Sooryanarayana	Dr.AIT, Bengaluru	AS	4	0.58	3
5	Dr. C E Nanjundappa	Dr.AIT, Bengaluru	AS	4	0.58	
6	Dr H V Ravindra	PESCE, Manadya	ME	4	0.58	
7	Dr. M.G. Krishnamurthy	JNNCE, Shimoga	MBA	4	0.58	
8	Dr. Srikanta Murthy K	PESIT, Bengaluru	CS	4	0.58	
9	Dr. T. Ananthapadmanabha	NIE, Mysuru	EC	4	0.58	
10	Dr. K Chandrashekara	SJCE, Mysuru	ME	3	0.44	4
11	Dr. Dinesh P A	MSRIT, Bengaluru	AS	3	0.44	
12	Dr S Kumarappa	BIET, Davanagere	ME	3	0.44	
13	Dr. V. Lokesha	AIT, Bengaluru	AS	3	0.44	
14	Dr H N Suresh	MCE, Hassan	EC	3	0.44	
15	Dr S Raghunath	BMSCE,	CV	3	0.44	

		Bengaluru				
16	Dr Joel Hemanth	RGIT, Bengaluru	ME	3	0.44	
17	Dr. K Sadashivappa	BIET, Davanagere	ME	3	0.44	
18	Dr. Y.C. Radhalakshmi	CST, Bengaluru	TE	3	0.44	
19	Dr A S Deshpande	GIT, Belagavi	ME	3	0.44	
20	Dr. B.K Sarojini	PACE, Mangalore	AS	3	0.44	
21	Dr D H Rao	GIT, Belagavi	EC	3	0.44	
22	Dr. G N Srinivasan	RVCE, Bengaluru	CS	3	0.44	
23	Dr G.P Shivashankara	PESCE, Manadya	CV	3	0.44	
24	Dr. H N Narasimha Murthy	RVCE, Bengaluru	ME	3	0.44	
25	Dr. K N Muralidhara	PESCE,Manadya	EC	3	0.44	
26	Dr. K R Suresh	BIT, Bengaluru	ME	3	0.44	
27	Dr. M Ravishankar	DSCE, Bengaluru	CS	3	0.44	
28	Dr P Dinesh	MSRIT, Bengaluru	ME	3	0.44	
29	Dr. Roopa T N	VTU,Belagavi	MBA	3	0.44	
30	Dr S Mohan Kumar	MCE, Hassan	ME	3	0.44	
31	Dr S Ravishankar	RVCE, Bengaluru	EC	3	0.44	
32	Dr. S.S. Hebbal	PDACE, Gulbarge	ME	3	0.44	
33	Dr. S.V. Dinesh	SIT,Tumkur	CV	3	0.44	
34	Shivakumar H R	KVGCE,Sullia	AS	3	0.44	
35	Dr Sreepathi L K	JNNCE,Shimoga	ME	3	0.44	
36	Dr V Sambasiva Rao	PESIT, Bengaluru	EC	3	0.44	
37	Dr V Sridhar	PESCE, Manadya	EC	3	0.44	
	110 No. Of Guide Supervised 2 Research Work			220	32.16	
	340 No. Of Guide Supervised 1 Research Work			340	49.71	
Total				**684**	**100**	

7.9 Rank wise distribution of Research Co-Guides:

Table 3 shows the rank-wise distribution of co-guide supervised doctoral theses under the study. Dr. K. Venkateswarlu, Dr. N.R. Banapurmath, Dr. P.S.K. Reddy and Dr. V D Mytri were successfully guided 3 doctoral degrees in the domain of Mechanical, Allied science and EC respectfully. Dr. G.R. Nagabhushana, Dr. K N Seetharamu, Dr. Lakshminarayanachari K and Dr. Ravishankar Deekshitare in second place with 2 doctoral theses. Similarly 2 doctoral theses guided by Dr. S George Milton, Dr. S Seetharamu, Dr. T.V. Venkatesha and Dr.V. Subramaniam have supervised in all domains of engineering and applied sciences. This clearly indicates that research co-guides from different departments are more involved in carrying out research activities with their research scholars and hence the output is also considerably good.

Table 3: Distribution of Research Co-Guides by Rank

Sl. No.	Name of the most productive Co-Guide	Affiliation	Broad	No. of Ph.D. theses	Percentage	Rank
1	Dr. K. Venkateswarlu	CSIR NAL, Bengaluru	ME	3	2.00	1
2	Dr. N.R. Banapurmath	BVBCET, Hubli	ME	3	2.00	
3	Dr. P.S.K. Reddy	AIT, Bengaluru	AS	3	2.00	
4	Dr. V D Mytri	PDACE, Kalaburgi	EC	3	2.00	
5	Dr. G.R. Nagabhushana	IISc, Bengaluru	ME	2	1.33	2
6	Dr. K N Seetharamu	PESIT, Bengaluru	EE	2	1.33	
7	Dr. Lakshminarayanachari K	SVIT, Bengaluru	ME	2	1.33	
8	Dr. Ravishankar Deekshit	BMSCE, Bengaluru	AS	2	1.33	
9	Dr. S George Milton	SSIT, Tumkur	EE	2	1.33	

10	Dr. S Seetharamu	CPRI Bengaluru	ME	2	1.33	
11	Dr. T.V. Venkatesha	KU, Shivamogga	AS	2	1.33	
12	Dr.V. Subramaniam	CSIR-CLRI, Chennai	TE	2	1.33	
13	122 No. Of Guide Supervised 1 Research Work	-		122	81.33	
Total				**150**	**100**	

7.10 Distribution of Ph.D. Degree Awarding with Time Span:

Table 4 explains the time span for awarding degrees after submission of Ph.D. theses. Submission of thesis same year 43 (6.29%) thesis awarded. It is to note that after submission of thesis one year 374 (54.68%) thesis awarded, followed by after submission of thesis two years 216 (31.58%) were awarded, whereas after 3year of thesis submission 42 (6.14%) were awarded, after 4 years of thesis submission 6 (0.88%) awarded. It is also noted that after 5 years of thesis submission 3 theses are awarded. To conclude the majority of the thesis was awarded after the submission of one year.

Table 4: Time Span for Awarding Degrees after Submission of Ph.D. Theses

Sl. No.	Year	Timeframe for awarding degrees after the submission of theses						Total	Percentage
		< 1 year	1 year	2 year	3 year	4 year	5 <		
1	2012	2	38	34	11	2	0	87	12.72
2	2013	6	59	31	7	1	0	103	15.06
3	2014	12	75	43	8	3	1	142	20.76
4	2015	7	78	38	4	0	1	128	18.71
5	2016	15	88	33	10	0	1	146	21.35
6	2017	1	36	37	2	0	0	78	11.40
Total		**43**	**374**	**216**	**42**	**6**	**3**	**684**	**100**
Percentage		**6.29**	**54.68**	**31.58**	**6.14**	**0.88**	**0.44**	**100**	

7.11 Distribution of PhD Theses by Length and Size

Figure 5 demonstrates the length and size of the thesis. Out of 684 theses, 32 (4.68%) theses were less than 100 pages, 483 (70.61%) theses were 100 to 200 pages followed by 144 theses (21.05%) were having 200 to 300 pages, whereas 25 (3.65) theses were having more than 300 pages. It is concluded that the majority of these are 100 to 200 pages. The thesis length and size should be determined by the type of study, discipline, variables analysis and available literature. Thus, it is unwise to limit the theses by length and size this is just like quality matters, not quantity. Focus on the quality of work you have done rather than focusing on how many pages it could be. But thesis should not look like a research paper (page-wise). After taking care of all the above aspects of these if it comes to 100 to 200 pages is worthwhile.

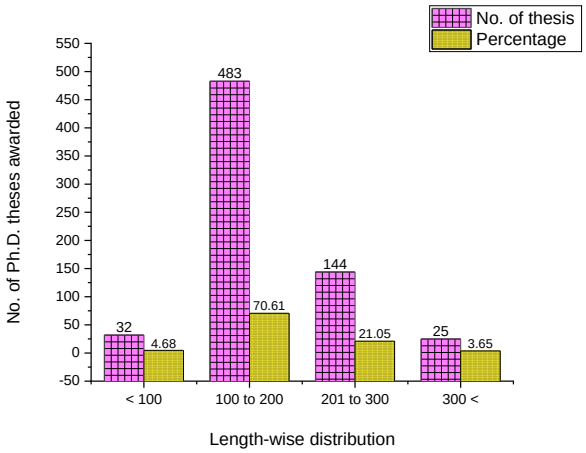


Figure 5: Length and Size Wise Distribution of Phd Theses

7.12 Rank Wise Distribution of Research Centers

Table 5 reveals that the rank wise distribution of VTU affiliated college wise distribution of doctoral degrees in engineering and technology. Out of total 684 doctoral degrees, the highest number i.e., 53(7.75%) has been contributed by M S Ramaiah Institute of Technology, Bengaluru stands first, B.M.S. College of Engineering, Bangalore comes next with 38(5.56%), and Basaveshwar Engineering College, Bagalkot stands in the third position with 37(5.41%) contribution. It is followed by R V College of Engineering, Bengaluru with 32(4.68%) degrees contributions. Similarly Sri Jayachamarajendra College of Engineering, Mysuru and P E S College of Engineering, Mandyastands in fifth position with each 30(4.39%) degrees. This is followed by other research centers, it can be observed from the table. Further the Govt. Engineering College, Haveri, Honeywell Technology, Bengaluru, New Horizon College of Engineering, Bangalore, Shridevi Institute of Engineering and Technology, Tumkur, Srinivas School of Engineering, Mangalore and T Johan College of Engineering, Bengaluru are stands last place with 23(0.29%) Remaining Each College has produced one Research having 24th rank among the research center of VTU.

Table 7: Rank-Wise Distribution of Research Output by Research Centers

Sl.No.	Name of the Research Center Under the VTU Affiliation in Karnataka	Year wise Distribution of Ph.D. Thesis							Percentage	Rank
		2012	2013	2014	2015	2016	2017	Total		
1	M S Ramaiah Institute of Technology, Bengaluru	7	8	16	9	9	4	53	7.75	1
2	B M S College of Engineering, Bengaluru	4	7	10	7	5	5	38	5.56	2
3	Basaveshwar Engineering College, Bagalkot	9	8	8	5	6	1	37	5.41	3
4	R V College of Engineering, Bengaluru	3	3	4	9	8	5	32	4.68	4
5	Sri Jayachamarajendra College of Engineering, Mysuru	3	5	5	9	5	3	30	4.39	5
6	P E S College of Engineering, Mandya	7	3	9	3	6	2	30	4.39	
7	National Institute of Engineering Mysuru	6	6	5	4	5	1	27	3.95	6
8	Siddaganga Institute of Technology, Tumkuru	5	3	6	5	3	3	25	3.65	7
9	BVB College of Engineering &	4	6	8	2	3	0	23	3.36	8

	Technology, Hubballi									
10	PES Institute of Technology, Bengaluru	1	2	9	8	2	1	23	3.36	
11	VTU RRC Belagavi	0	0	3	4	13	3	23	3.36	
12	Bapuji Institute of Engineering and Technology, Davangere	1	5	4	4	2	6	22	3.22	9
13	Dr. Ambedkar Institute of Technology, Bengaluru	2	0	3	8	7	2	22	3.22	
14	KLS Gogate Institute of Technology, Belagavi	2	6	5	5	3	0	21	3.07	10
15	Malanad College of Engineering, Hassan	5	5	4	4	1	1	20	2.92	11
16	PujjyaDoddappaAppa Institute of Technology, Kalaburgi	3	3	8	4	2		20	2.92	
17	JNN College of Engineering, Shivamogya	3	5	3	4	2	1	18	2.63	12
18	Bangalore Institute of Technology, Bengaluru	0	3	2	4	5	1	15	2.19	13
19	SDM College of Engineering & Technology, Dharwad	1	3	2	1	4	3	14	2.05	14
20	Dayanand Sagar College of Engineering, Bengaluru	0	1	5	2	6	0	14	2.05	
21	Sri Siddartha Institute of Technology, Tumkuru	4	0	3	0	2	1	10	1.46	15
22	Acharya Institute of Technology, Bengaluru	3	1	1	0	3	2	10	1.46	
23	NMAM Institute of Technology, Nitte	4	0	2	2	0	1	9	1.32	16
24	RNS Institute of Technology, Bengaluru	0	0	1	0	5	3	9	1.32	
25	East Point College of Engineering & Technology, Bengaluru	1	2	0	0	3	2	8	1.17	17
26	National Aeronautical Laboratories, Bengaluru.	4	2	0	0	1	0	7	1.02	18
27	BNM Institute of Technology, Bangalore	0	0	3	1	1	2	7	1.02	
28	JSS Academy of Technical Education, Bengaluru	0	1	1	1	1	3	7	1.02	
29	Sir M Visvesvaraya Institute of Technology, Bengaluru	0	0	2	1	3	1	7	1.02	
30	KVG College of Engineering, Sullia	0	1	0	3	1	1	6	0.88	19
31	Nitte Meenakshi Institute of Technology, Bangalore	0	3	1	0	1	1	6	0.88	
32	PA College of Engineering, Mangaluru	0	1	1	2	1	1	6	0.88	
33	Reva Institute of Technology & Management, Bengaluru	0	0	0	0	2	4	6	0.88	
34	KLE College of Engineering & Technology, Belagavi	1	1	2	0	0	1	5	0.73	20
35	MVJ College of Engineering, Bengaluru	2	0	0	0	3	0	5	0.73	
36	Govt. Sri Krishnarajendra Silver Jubilee Technological Institute Bengaluru	0	1	0	0	4	0	5	0.73	
37	SJC Institute of Technology, Chikkaballapur	1	2	0	0	1	0	4	0.58	21
38	Aeronautical Development,	0	0	0	4	0	0	4	0.58	

	Bengaluru									
39	Indian Space Research Organisation (ISRO) Bengaluru.	0	1	0	1	2	0	4	0.58	
40	Central Silk Technology, Bengaluru	0	0	0	1	2	0	3	0.44	22
41	Central Silk Board Bengaluru	0	3	0	0	0	0	3	0.44	
42	Dr. T. Thimmaiah Institute of Technology, KGF	0	0	0	2	1	0	3	0.44	
43	IFIM Business School, Bengaluru	0	1	0	1	0	1	3	0.44	
44	Sambhram Institute of Technology, Bengaluru	0	0	0	1	1	1	3	0.44	
45	Sapthagiri College of Engineering, Bengaluru	0	0	0	0	2	1	3	0.44	
46	Sri Jagadguru Balagangadharnath Institute of Technology, Bengaluru	0	0	0	1	1	1	3	0.44	
47	Govt. Engineering College, Haveri	0	0	0	0	0	2	2	0.29	23
48	Honeywell Technology, Bengaluru	0	0	0	1	1	0	2	0.29	
49	New Horizon College of Engineering, Bengaluru	0	0	0	1	1	0	2	0.29	
50	Shridevi Institute of Engineering and Technology, Tumkur	0	0	0	1	1	0	2	0.29	
51	Srinivas School of Engineering, Mangalore	0	0	0	0	0	2	2	0.29	
52	T Johan College of Engineering, Bengaluru	0	0	0	0	2	0	2	0.29	
53	Remaining Each Colleges Produced one Research	1	1	6	3	3	5	19	2.78	
Total		**87**	**103**	**142**	**128**	**146**	**78**	**684**	**100.00**	

8. CONCLUSIONS

This study highlights the perspective of the research activities in VTU during 2012-2017. So far 684 doctoral degrees were awarded in 8 domains, namely civil, mechanical, and electrical, computer science, applied sciences, management sciences electronics, and technology. The research productivity depends on the contributions of the research scholar and the role of their guide(s) is highly significant. The present study revealed that an average 114 doctoral theses are being awarded every year. However, from the years 2014 and 2016 the research output has increased significantly with 44 percent of doctoral degrees being awarded in the six years. Maximum research was carried out in Mechanical (202, 33%) engineering domain. It is clear from this study that research productivity increased from the year 2013. But between 2016 and 2017 drastically down the award of a doctoral degree from 146 (23%) to 78 (11%). This was due to the modifications in the research regulations. This study leads to planning the VTU research activities and upgrading the existing system.

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